Remarks

Claim 1 is here amended. Support for this amendment is found in the specification as filed, page 2, lines 23-30.

Claims 1-9 and 11 remain pending. Claim 10 was previously canceled. No new matter has been added, and no new material presented that would necessitate an additional search on the part of the Examiner. Applicants note with appreciation that the Office Action withdraws the objection to the specification.

Claims as here amended comply with 35 U.S.C. 103(a)

The Office Action on page 6 rejects claim 1 under 35 U.S.C. §103(a) in view of Toyoda et al. (U.S. patent number 6,630,953, issued October 7, 2003) and Uematsu (U.S. patent number 5,892,551, issued April 6, 1999). Applicants characterize each independent claim, then each reference, then analyze the combination of references.

Claim 1 as here amended is directed to a camera for recording pictures that has an image sensor for receiving a picture, a processing unit for processing the picture, and an end processing unit. The camera contains, between the processing unit and the end processing unit, a means for removing light modulation between different fields of the picture by averaging stored images having the same light modulation. The means for removing light modulation also comprises a motion detector for detecting the effect of motion on a scene.

Toyoda et al., U.S. patent number 6,630,953, issued October 7, 2003

Toyoda taken as a whole shows an imaging apparatus for correcting flicker by detecting the mean luminance of two areas of a picture signal divided by a movable boundary. See Toyoda et al., column 1, lines 43-46. The flicker in each of the two areas is

corrected to derive a correction-resultant area in response to the mean luminance. Ibid., column 1, lines 52-53. The two correction-resultant areas are then combined into a correction-resultant picture. Ibid., column 1, lines 55-57.

Applicants' camera of claim 1 as here amended averages stored images with the same light modulation. Applicants assert that Toyoda's calculating of mean brightness among divided areas of a field is not a teaching or suggestion of averaging stored images with the same light modulation. Rather, Toyoda's imaging apparatus divides each picture into a few areas, then detects mean luminance of the first area and the mean luminance of the second and possible subsequent areas, corrects each area in response to the other area, then combines the areas. Ibid., column 1, lines 46-48. The Office Action on page 11 admits that Toyoda fails to specifically disclose storing different fields of the picture.

The Office Action cites the following lines from Toyoda:

> In the prior-art solid-state imaging apparatus of FIG. 1, the mean luminance detector 4 calculates a mean luminance (a mean brightness) of every field represented by the digital video signal outputted from the A/D converter 3. The mean luminance detector 4 informs a microcomputer 5 of the calculated mean luminance of every field. The microcomputer 5 determines a desired gain factor on the basis of the calculated mean luminance of every field...[t]he mean luminance detector 14 calculates mean luminances (mean brightnesses) of the respective four divided areas of every field represented by the digital video signal outputted from the A/D converter 13. The mean luminance detector 14 informs a microcomputer 15 of the calculated mean luminances of the respective four divided areas of every field. [see Toyoda, column 3, lines 55-59, column 4, lines 40-47, emphasis added]

However, Toyoda's calculation of mean luminance of respective divided areas is not the same as the subject matter of Applicants' claim 1, which is directed to a camera for removing light modulation by averaging stored images having the same light modulation.

Toyoda fails to teach or suggest any camera having an image sensor for averaging stored images to remove light modulation, as is the subject matter of Applicants' claim 1 as here amended.

In addition, Toyoda does not teach or suggest a light modulation removal means to detect the effect of motion on a scene, as admitted in the Office Action on page 7. Thus Toyoda fails to teach or suggest at least two elements of claim 1 as here amended.

Uematsu, U.S. patent number 5,892,551, issued April 6, 1999

Uematsu taken as a whole shows a flicker reducing circuit in a terminal that displays character data and image data on a display unit. See Uematsu, column 1, lines 6-9. Uematsu's flicker reducing circuit contains two delay units. One of these units delays composite data processed in the display processing unit by a process time in the vertical low-pass filter, and then outputs the result. Another of these units receives character image data formed of only character data, among data processed in the display processing unit, and delays the data by a processing time in the vertical low-pass filter, then outputs the result. Ibid., column 1, lines 36-42. Averaging simply does not appear in Uematsu.

Uematsu's circuit reads character data and composite data out of a memory unit to display them. Ibid., column 1, lines 31-32.

Further, Uematsu states:

> The noise reducer separates an area into plural steps according to a motion rate of the input display signal between the previous frame and the following frame, multiplies a differential signal between the previous frame and the following frame by a coefficient which is set to a larger value to a slower moving area, and outputting a signal obtained by subtracting the multiplication result from the input display signal. [See Uematsu, column 4, lines 33-40, emphases added]

This section of Uematsu shows that the noise reducer does not teach or suggest averaging images having the same light modulation to remove light modulation. Rather, Uematsu shows only multiplying a signal by a coefficient, then subtracting the multiplication result from the input display signal to obtain an output display signal.

The Office Action on page 7 states that Uematsu teaches a flicker reducing circuit consisting of a noise reducer in which mosquito noises are removed through motion detection between a previous frame and the following frame, and a motion detection signal in motion detection. However, the noise reducer in Uematsu's flicker reducing circuit is not the same as, and also fails to teach or suggest, a means for removing light modulation by averaging stored images having the same light modulation, as is the subject matter of Applicants' claim 1 as here amended.

In Uematsu's noise reducer, "...the one frame delay unit delays a display signal input via the subtracter by one frame and then inputs the result to the subtracter. The subtracter detects the difference between the delayed display signal and a current display signal. The motion detecting circuit reads a motion based on the difference and then outputs a motion detection signal." See Uematsu, column 7, lines 54-60, emphases added.

In contrast, claim 1 as here amended is directed to removing light modulation by averaging stored images having the same light modulation, where the light modulation removal means further comprises a motion detector.

Thus, Uematsu fails to cure the defects of Toyoda. Uematsu fails to teach or suggest a camera. Further, Uematsu fails to teach or suggest, or even mention averaging, let alone averaging stored images having the same light modulation. Uematsu does not teach or

suggest detecting the effect of motion on a scene via the light modulation removal means, as is the subject matter of claim 1 as here amended.

For these reasons, claim 1 as here amended is not obvious in view of the combination of Toyoda and Uematsu. Applicants respectfully request that this rejection be withdrawn.

Callahan, U.S. patent number 6,380,985, issued April 30, 2002

The Office Action on page 7 rejects claims 2-7 in view of Toyoda, Uematsu, and further in view of Callahan (U.S. patent number 6,380,985, issued April 30, 2002). Claims 2-7 depend directly or indirectly from claim 1 and incorporate all of the subject matter of claim 1, and contain additional subject matter.

Callahan shows a system for processing a video stream for a television. See Callahan, Figs. 1 and 2. Callahan shows filtering a data stream to produce a reduced-size display image while minimizing flicker. Ibid., column 1, lines 46-49. The Callahan system contains a resizing and filtering component to remove and resize two fields of interlaced scan lines by averaging pairs of sequential scan lines, producing averaged line pairs. Ibid., column 5, lines 9-11. The component then filters the averaged line pairs to remove interlace flickering. Ibid., column 5, lines 13-17.

In contrast to Callahan, claim 1 and its dependent claims are directed to a camera that contains a means for removing light modulation between different fields of the picture by averaging stored images having the same light modulation. The means for removing light modulation also comprises a motion detector for detecting the effect of motion on a scene.

Callahan fails to teach or suggest a motion detector, as admitted by the Office Action dated May 4, 2005 (page 8, section 11). Callahan fails to teach or suggest any stored images,

let alone averaging stored images, let alone averaging stored images having the same light modulation. Callahan's averaged line pairs are not a teaching or suggestion of a camera, or of averaging stored images with the same light modulation.

The Office Action on page 8 alleges that Callahan discloses means to decrease the averaging of consecutive images. If this interpretation of Callahan is correct, then Callahan actually teaches away from the subject matter of Applicants' claims. The cited portion of Callahan states:

> Notice that the odd and even fields of the line pairs are interlaced so that the odd and even fields can be output at alternating times. After one field is output and begins to fade, the other field is output to replace the fading first field. This alternating pattern results in a continual refreshing of the displayed image. The lines are refreshed at a high frequency that is imperceptible to the human eye, so that the image appears constant to the viewer. Conventional TVs and computer monitors operate at 60 Hz, meaning that the whole screen is refreshed once every 1/60 or 0.01667 second. In contrast, the human eye only begins to perceive a non-constant flickering at a much slower frequency of about 10 Hz. [See Callahan, column 4, lines 33-45]

Applicants assert that this passage fails to teach or suggest averaging stored images.

The Office Action on page 9 admits that Callahan fails to teach or suggest means to correct consecutive images to the same temporal position using motion compensation techniques prior to the averaging.

Claims 2-7 depend directly or indirectly from claim 1, therefore incorporate all of the subject matter of claim 1 as well as having additional subject matter. As Callahan fails to cure the defects of Toyoda and Uematsu with respect to claim 1, from which rejected claims 2-7 depend, and as the subject matter in claim 1 as here amended is not obvious in view of the combination of Toyoda, Uematsu, and Callahan, thus claims 2-7 also are not obvious in view of these references alone or in any combination.

Applicants respectfully request that rejection of claims 2-7 under 35 U.S.C. 103(a) be withdrawn.

Thompson et al., U.S. patent number 6,489,998, issued December 3, 2002

The Office Action rejects claims 8 and 9 as obvious in view of Toyoda, Uematsu, Callahan and Thompson et al. (U.S. patent number 6,489,998, issued December 3, 2002). As a preliminary matter, claims 8 and 9 depend directly or indirectly on claim 1, and incorporate all of the subject matter of claim 1 as here amended and the subject matter of intervening claims, and contain additional subject matter.

Thompson shows a digital image processor that contains a deinterlacing processor. Thompson's deinterlacing processor receives an interlaced video stream and transmits a deinterlaced video stream. See Thompson, column 3, lines 1-5. This deinterlacing processor performs frequency analysis on the interlaced video stream to output deinterlaced video stream with reduced motion artifacts. Ibid., column 3, lines 5-8. Motion artifacts are detected by analyzing frequency information in a single video frame. Ibid., column 3, lines 12-14.

Thompson fails to teach or suggest averaging the different fields of dependence in motion, and/or locations with low respectively high luminance locations, which was admitted in the Office Action on page 11. Thompson simply does not teach or suggest averaging stored images with the same light modulation. Thompson does not even mention a light modulation removal means that also detects the effect of motion.

Claims 8 and 9 depend directly or indirectly on claim 1 and contain all of the subject matter of claim 1, as well as additional subject matter. As Thompson fails to cure the defects

of Toyoda, Uematsu and Callahan with respect to claim 1, claims 8 and 9 are not obvious in view of these references.

Applicants respectfully request that rejection of claims 8 and 9 under 35 U.S.C. 103(a) be withdrawn.

The Office Action rejects independent claim 11 under 35 U.S.C. §103(a) in view of Toyoda and Thompson and further in view of Uematsu and Van Rooy.

Claim 11 is directed to a method of removing light modulation during recording pictures with an image sensor. The method has steps of: receiving a picture, processing the picture, removing the light modulation by storing different fields of the picture and averaging the different fields in dependence of motion, and/or locations with low respectively high luminance locations. The removing step includes averaging images having the same light modulation, and detecting the effect of motion on a scene.

Van Rooy, U.S. patent number 6,657,659, issued December 2, 2003

Van Rooy (U.S. patent number 6,657,659, issued December 2, 2003) taken as a whole refers to a method of compensating an image signal for AC light source induced fluctuations. See Van Rooy, column 2, line 43-46. The method in Van Rooy has steps of generating an average signal representing the average image signal content, and processing the image signal to obtain a corrected signal. Ibid., column 2, line 46-49.

Toyoda as described above shows an imaging apparatus for removing light modulation by dividing a field into four areas, with a multiplier assigned to each area. Each of the four multipliers in Toyoda's device multiplies the output signal of an A/D converter by a gain factor to suppress or correct flicker in each of the four areas individually. See

Toyoda, column 5, lines 10- 35. Each multiplier outputs a digital video signal to an area combining device. Ibid., column 5, lines 10-35. Toyoda states, "[b]asically, the area combining device chooses one from among the output signals Sa, Sb, Sc, and Sd of the multipliers 17A, 17B, 17C, and 17D." Ibid., column 5, lines 50-55 [emphasis added].

In contrast to claim 11, Toyoda does not teach or suggest a method of storing images, as admitted in the Office Action on page 11. Toyoda also fails to teach or suggest a method of averaging stored images with the same light modulation as a means of removing light modulation, as is the subject matter of Applicants' claim 11. The Office Action on page 11 admits also that Toyoda and Thompson in combination fail to teach or suggest averaging the different fields in dependence of motion, and/or locations with low respectively high luminance locations.

A table is here appended to compare elements of claim 11 and Toyoda's actual teachings, as probative evidence of this reference's failure to teach or suggest these elements.

Van Rooy like Toyoda and Thompson fails to teach or suggest averaging images with the same light modulation. Further, like Toyoda and Thompson, Van Rooy fails to teach or suggest a method of detecting an effect of motion on a scene, as admitted in the Office Action on page 11. In fact, the Office Action on page 11 admits that Toyoda, Thompson and Van Rooy fail to teach or suggest a method of detecting the effect of motion on a scene. Therefore, Van Rooy fails to cure the defects of Toyoda alone, or in combination with Thompson. See the Table appended hereto.

The Office Action on page 11 asserts that Uematsu teaches a flicker reducing circuit which removes noise through motion detection between a previous frame and the following frame, and a motion detection signal in motion detection. However, Uematsu fails to teach or suggest a method of detecting motion based on differences in light modulation between fields. Uematsu also fails to teach or suggest a method for removing light modulation by storing and averaging different fields of the picture in dependence of motion. Therefore, Uematsu fails to cure the defects of Toyoda alone, or in combination with Thompson and Van Rooy. See the Table appended hereto, which by including quotes from these references as cited in the Office Action presents evidence that at least two elements of claim 11 are neither taught nor suggested by any of these references.

For these reasons, claim 11 is not obvious in view of the combination of Toyoda, Thompson, Van Rooy and Uematsu. Applicants respectfully request that this rejection be withdrawn.

Legal criteria for obviousness

According to the *Manual of Patent Examining Procedure,* §2142, p. 104 (8th Ed. Rev.2, May 2, 2004) the examiner in view of factual information makes a determination of whether the claimed invention "as a whole" would have been obvious at that time to that person. *Id.* Knowledge of Applicants' disclosure must be put aside in reaching this determination, and kept in mind only to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. *Id.* Impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art. *Id.*

None of the cited references suggest any combination with any of the others. No motivation is provided by these references to make the invention of claim 1 as here amended or claim 11.

To establish obviousness based on a combination of the elements disclosed in the prior art in the absence of any hindsight, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. *Id.* The teaching or suggestion, not merely to make the claimed combination, but also of a reasonable expectation of success, must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488; 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

The characterizations of the references herein have looked at each reference as a whole, and have further analyzed those portions cited in the Office Action, to determine whether a prima facie case for obviousness has been made.

Section 2143 of the *Manual of Patent Examining Procedure* states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.
>
> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The facts presented above show that first, Toyoda, Uematsu, Callahan, Thompson and Van Rooy fail to teach or suggest all of the elements of the claims. See the Table appended hereto. Second, none of Toyoda, Uematsu, Callahan, Thompson and Van Rooy

motivate finding a solution to the problem addressed by the present claims, let alone suggest a combination with other cited references, let alone suggest how to modify the other references to arrive at the subject matter of the claims. For either of these reasons, a *prima facie* case of obviousness in view of the cited references has not been made.

For these reasons, Applicants assert that the present claims comply with 35 U.S.C. §103(a), and respectfully request that rejection of claims 1-9 and 11 under 35 U.S.C. §103(a) be withdrawn.

Summary

On the basis of the foregoing reasons, Applicants respectfully submit that the pending claims are in condition for allowance, which is respectfully requested.

If there are any questions regarding these remarks, the Examiners are invited and encouraged to contact Applicants' representative at the telephone number provided.

Respectfully submitted,

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Analysis of failure of prior art to teach or suggest elements of Claim 11

Elements of Claim 11	Toyoda[1]	Uematsu[2]	Thompson[3]	Van Rooy[4]
...removing the light modulation by storing different field of the picture...	No removal of light modulation by storing different fields of the picture[5]	No removal of light modulation by storing different fields of the picture[6]	No removal of light modulation by storing different fields of the picture[7]	No removal of light modulation by storing different fields of the picture[8]
...averaging images having the same light modulation...	Does not average images having the same light modulation	Does not average images having the same light modulation	Does not average images having the same light modulation	Does not average images having the same light modulation

[1] U.S. patent number 6,630,953, issued October 7, 2003
[2] U.S. patent number 5,892,551, issued April 6, 1999
[3] U.S. patent number 6,489,998, issued December 3, 2002
[4] U.S. patent number 6,657,659, issued December 2, 2003
[5] Toyoda, column 1, lines 45-56, reads: "...correcting a flicker in the first area to derive a first correction-resultant area in response to the mean luminance of the first area...correcting a flicker in the second area to derive a second correction-resultant area in response to the mean luminance of the second area ...combining the first correction-resultant area and the second correction-resultant area into a correction-resultant picture."
[6] Uematsu, column 1, lines 63-67, reads: "the character data and the composite data input to the display processing unit 83 is stored into the memory unit 88. The memory unit 88 includes a composite image line memory for storing the composite data and a character image line memory for storing character data."
[7] Thompson, column 3, lines 3-4, reads: "...a digital memory for storing portions of the interlaced video signal..."
[8] Van Rooy integrates over N fields of an image signal. See Van Rooy, column 2, lines 49-56